

M.Sc. Chemistry

Course Outcomes

M.Sc. (Analytical Chemistry)

Program Outcome: **Master of Science (M.Sc.) in Chemistry** is a post graduation course of University of Pune. The credit system to be implemented through this curriculum, would allow students to develop a strong footing in the fundamentals and specialize in the disciplines of his/her liking and abilities. Programme Specific Outcome: The students pursuing this course would have to develop in depth understanding of various aspects of the subject. The conceptual understanding, development of experimental skills, designing and implementation of novel synthetic methods, developing the aptitude for academic and professional skills, acquiring basic concepts for structural elucidation with hyphenated techniques, understanding the fundamental biological processes and rationale towards computer assisted drug designing are among such important aspects.

Course Outcomes M. Sc I

Physical Chemistry: Students will understand the basic fundamental of physical chemistry such as thermodynamics, Chemical kinetics and reaction dynamics, Molecular spectroscopy, Nuclear and Radiation chemistry

Inorganic Chemistry: Students will get acquainted with the theoretical concepts of molecular symmetry and general chemistry of p-block element and their industrially important compounds (Organometallic compound). They will also understand the role and importance of coordination compound and elements in biological processes

Organic Chemistry: To understand some fundamental aspects of organic chemistry, to learn the concept aromaticity heterocyclic compound containing one and two hetero atoms with their structure, synthesis and reactions. Students will be able to understand MOT and will be able to extend this in predicting reaction mechanism and stereochemistry of electrocyclic reactions. The concepts in free radical reactions, mechanism and the stereo chemical outcomes. The basic principle of spectroscopic methods and their applications in structure elucidation of organic compounds using given spectroscopic data or spectra.

General Chemistry: Student will develop skills in use of Safety in chemical laboratory and good laboratory practices. They have to understand the importance of Mass, GC and HPLC techniques for the analysis of inorganic and organic compounds.

Skill Based extra credit course: Students will be aware of their rights and duties as a responsible citizen. They will get the knowledge of cyber security and different hacks done through social media.

Course Outcomes M. Sc. II

Paper I: Students should be able to Define various terms in electrochemistry and thermogravimetry. Interpret polarogram, cyclic voltammogram, pulse polarogram, thermogram, differential thermogram and DSC thermogram. Differentiate among the various methods of electrochemistry and thermogravimetry. Students should be able to understand various terms in atomic absorption, atomic emission, fluorescence, ESR and electron spectroscopy.

Paper II: Learning and understanding various terms in pharmaceutical raw material and finished product analysis, various pharmaceutical dosage forms and types of raw materials used, basic principles of methods of pharmaceutical analysis according to IP.

Paper III: Students understand various terms in chromatography (GC and HPLC) and mass spectroscopy, instrumentations in chromatography (GC and HPLC) and mass spectroscopy. Students understand various terms in soil analysis, pesticide residue analysis, detergent analysis and polymer analysis.

Paper IV: Students various terms in Electrophoresis, capillary electrophoresis, HPTLC, Body fluid analysis, ELISA, RIA. 2. Explain instrumentations in in Electrophoresis, capillary electrophoresis, HPTLC, Body fluid analysis, ELISA, RIA.

Skill Based extra credit course: Students should be aware of different hacks and cyber security done through social media. They can get the ideas of skills development in different fields through this course.

Practical/ Project Course: M. Sc I and M.Sc. II

By performing these courses, student will develop fundamental, theoretical and experimental knowledge with respect to the following:

- i. Maintain proper record of analytical data in notebook. Observe personal safety in laboratory and able to handle all chemicals, instruments, etc safely in laboratory.
- ii. Define / understand various terms involved in practical methods of quantitative analysis.
- iii. To analyse organic and inorganic materials using appropriate chemical / instrumental methods
- iv. Explain / describe basic principles of chemical / instrumental methods used for analysis. Able to handle particular instrument according to SOP.
- v. Perform analysis of sample with described procedure. Able to handle analytical instruments.
- vi. Apply / select particular method / instrumental parameters for analysis of given sample.
- vii. Maintain appropriate reaction conditions as described in procedures.
- viii. To perform i) selective analysis of particular component from sample. ii) Analysis at trace level from sample.
- ix. To conclude the results and take the decision regarding quality of sample.
- x. To perform calculations and interpret the results.